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SUICÍDIOS NO CENTRO DE PORTUGAL: ANÁLISE CASUÍSTICA ENTRE 2003 E 2009

SUICIDES IN THE CENTRE OF PORTUGAL: ANALYSIS BETWEEN 2003 AND 2009

ARTIGO CIENTÍFICO

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RESUMO

Como um dos problemas mais específicos do ser humano, o suicídio tem vindo a ser investigado com atenção crescente um pouco por todo o mundo. Vários comportamentos de risco têm vindo a ser descritos, assim como as limitações que decorrem do seu estudo.

A Organização Mundial de Saúde estima que este flagelo afecte um milhão de pessoas anualmente, o que se traduz numa morte a cada 40 segundos em todo o mundo. Segundo últimos estudos, Portugal, apesar dos bons índices (10 mortes por suicídio por 100000 habitantes), vinha apresentando uma tendência crescente entre os mais jovens.

Com este trabalho pretendeu-se caracterizar a evolução do perfil suicida autopsiado no Serviço de Patologia Forense da Delegação do Centro do Instituto Nacional de Medicina Legal sob o ponto de vista de várias variáveis: Idade, sexo, estado civil, situação profissional, meio suicida, análises toxicológicas efectuadas (etanol, drogas de abuso, pesticidas e medicamentos) e algumas condições/comportamentos relativas à história pessoal (alcoolismo, ideação suicida, tentativas de suicídio, doença física, perturbação psiquiátrica). Para isso foram analisados os arquivos relativos ao período decorrido entre 1 Janeiro de 2003 e 31 de Dezembro de 2009. Finalmente uma breve abordagem a estratégias de prevenção resultantes de outros estudos, nacionais e internacionais, foi elaborada para concluirmos sobre a sua possível eficácia.

O perfil comum obtido corresponde a um homem com idade compreendida entre os 65 e os 74 anos, casado, empregado que se suicidou através do enforcamento em Setembro, Maio ou Fevereiro. O sujeito seria submetido à determinação laboratorial da concentração sanguínea de álcool, medicamentos e pesticidas. O seu registo clínico incluiria um problema de saúde orgânico ou psiquiátrico, para além de comportamentos de risco como alcoolismo, ideação suicida ou tentativas de suicídio.

Apesar das limitações inerentes a um tema tão individual e subjectivo como é o suicídio algumas conclusões foram possíveis. O número de suicídios autopsiados na delegação do Centro aumentou, assemelhando-se o perfil ao resultado de muitos outros autores, inclusivamente ao do perfil já elaborado anteriormente nesta delegação. Contudo, novos desenvolvimentos médico-sociais colocam, agora, o enforcamento como o meio suicida preferido.

Muitas barreiras continuam por derrubar mas vários programas de prevenção, derivados de uma crescente preocupação, começam a ser desenhados e postos em prática. Futuras avaliações e intervenções ao nível médico e social, incluindo no processo de certificação da morte, serão fundamentais para uma compreensão cada vez mais realística deste fenómeno.

Palavras-chave: suicídio; 2003-2009; centro de Portugal.

ABSTRACT

As one of the more specific problems of human beings, suicide has been investigated with increasing attention all over the world. Several risk factors have been described as well as limitations arising from their study.

The World Health Organization estimates that this scourge affects one million people annually, which corresponds to one death every 40 seconds worldwide. According to recent studies, Portugal, despite the good rates (10 suicide deaths per 100,000 inhabitants), had shown an increasing trend among younger people.

This work aims to characterize the evolution of the suicidal profile autopsied at the Forensic Pathology Department of the Centre Branch of the National Institute of Legal Medicine of Portugal, analyzing several variables: age, gender, marital status, employment status, suicidal methodology, toxicological analysis (ethanol, drugs of abuse, pesticides and drugs) and some conditions/behaviors regarding personal history (alcoholism, suicidal ideation, suicide attempts, physical illness, psychiatric disorder). All the autopsies from the 1st January 2003 to December the 31rd 2009 were analysed. Finally a brief approach to prevention strategies arising from other national and international studies we completed in order to evaluate its effectiveness.

The suicidal profile achieved corresponded to a man, aged between 65 and 74 years old, married, employed, who committed suicide by hanging, in September, May or February. The subject would be submitted toxicological analysis. Clinical records include an organic health problem or psychiatric, in addition to risk behaviors such as alcoholism, suicidal thoughts or suicide attempts.

The number of suicides autopsied at the Centre Branch has increased, resembling the profile to the result of many other authors. However, new medical and social developments place hanging as the favorite suicide method in our study. Many barriers remain to

overthrow but several prevention programs begin to be designed and implemented. Future evaluations and interventions at the social and medical level, including the death certification process, will be fundamental to a better realistic understanding of this phenomenon.

Keywords: suicide; 2003-2009; Centre of Portugal.

1. Introduction

Suicide presents, itself, one of the largest and most complex social problems that has accompanied man since antiquity. Derived from the Latin *sui* (yourself) and *cidium* (kill) [1], this deliberate act of ending one's own life has always been far from an unanimous acceptance and currently is a target of increasing concern throughout the scientific community, asserting itself as an increasingly serious public health problem [1,2]. According to the World Health Organization, this specifically human problem makes nearly one million deaths annually worldwide, of which about 58,000 occur in the European Union and 200,000 amongst teenagers or young adults [3], which is equivalent to a death every 40 seconds, placing suicide among the 10 most frequent causes of death in all age groups and the 2nd in young people aged 15-29 [4].

The doubling of the suicide rate between 2000 and 2003 stabilized its values at around 10.0 per 100 000 inhabitants, which represented 14,753 years of potential life lost in 2009 [5, 6]. Meeting with the increasing age pattern, typical of developed countries, adolescents and young adults represent only about 2-4% of all suicides in Portugal [5, 7]. There is, however, a slight upward trend from 2000 to 2004, an analysis that is dubious due to the large proportion of deaths from undetermined cause in our country [4, 8, 9].

Although the number of attempts is higher in females, in terms of geography and age, all studies point to a higher prevalence of suicide among males [2, 4, 5, 6, 7, 8, 10]. In addition to socio-cultural factors, the explanation is based on the first choice for more lethal manners between males. This difference becomes more pronounced in upper age groups [2, 4, 8, 10, 11]. However, the hanging suicide emerges as the most used method by both sexes. Poisoning, firearms use (especially in men), precipitation and drowning are the next more common causes. Poisoning is listed as the 2nd mean more common in European countries. However, it represents the most frequent method used by Portuguese in 2001 [4, 10, 11, 12].

As a universal phenomenon, diverse knowledge branches have studied suicide. Schneidman described, as a suicide scenario: psychological pain, loss of self-esteem, constriction of the mind, isolation, despair and escape, and Durkheim considers suicide to be a reflection of the whole social fabric of a community [2, 7, 11, 13]. These and many other studies have offered an approach on the typical profile of an increased suicide risk, in order to ensure the proper and targeted prevention strategies that have been outlined by the European Commission (suicide is one of five primal areas of the European Pact for Mental Health and Welfare, 2008) [14]. Family problems; economic, religious and cultural issues; social loss of cohesion; medical troubles, with a great influence of psychiatric history (alcohol, drugs, mood disorders…), difficulties at work, school or court; isolation; and even the newly titled Werther-Cobain effect, represent slices of the complex role of extreme motivations [3, 8, 9, 11, 15].

This work aims to analyze the suicides autopsied at the Centre Branch of the National Institute of Legal Medicine between 2003 and 2009, according to various variables. With these results, we intend to make some conclusions about the prevention strategies applying possibility, derived from several European studies based on evidence, to adolescents and young adults (15-34 years), with special focus on those established by the European Alliance Against Depression (EAAD) [3,10,14].

2. Material studied

This study has been carried out by the National Institute of Legal Medicine of Portugal (INML, I.P), being all the samples collected by forensic pathologists from the Forensic Pathology Department (FPD) of the Centre Branch of the INML, I.P. (from January 2003 to December 2009).

As data material of the present study, 2458 autopsies were checked out for suicides from the FPD. The target population consisted of people that committed suicide.

Assessment of the examination protocols was conducted by means of a tabular database according to the following criteria: year, month, season, sex, age (according to the division made by WHO), marital status, occupation, suicide method, toxicological analysis and results, personal history (Alcoholism and Drug addiction; Suicide attempts and suicidal ideation; Physical illness and Psychiatric disorders; Isolation/Loneliness). All these several variables were studied and all the pertinent data was registered, separated and statistically treated with the SPSS program (Statistical Package for Social Sciences).

Results

3.1. Number of cases

At the Forensic Pathology Department of the Centre Branch, a total of 2458 autopsies were performed between January 2003 and December 2009, 304 on suicide victims (representing 12.4% of all the analysed autopsies). We observed that, when analising all the years, the highest number of suicides occurred in 2007, with 53 cases. No specific suicide number variation was found throughout the studied period.

3.2. Year, month and season distribution

We can observe that 2007 had the highest number of suicide victims, with 53 cases (15.6%) and the lowest percentage was achieved in 2006, with 29 cases, corresponding to 8.7% of the total suicide cases in this specific year (Fig. 1).

When analysing the results by month, it can be concluded that February, May and September had the highest number of cases, with 31, 32 and 34 cases, corresponding to

10.2%, 10.5% and 11.2%, respectively, being December the month with the less number of suicides (5.9%) (Fig. 1)

The seasons with the highest number were Spring and Winter, with 81 and 80 suicides, respectively (representing 26.6% and 26.3%).

For adolescents and adults younger than 35 years-old the year with the highest percentage was 2006, with 8 suicides corresponding to 27.5% of all suicides in that year. The month and season remained the same. This age class represented 23.6% of all suicides occurred in September. Moreover, 2.6% of all 304 suicides happened in this age group and in this month. Winter represents 40.5% of all suicides commited by adolescents and young adults.

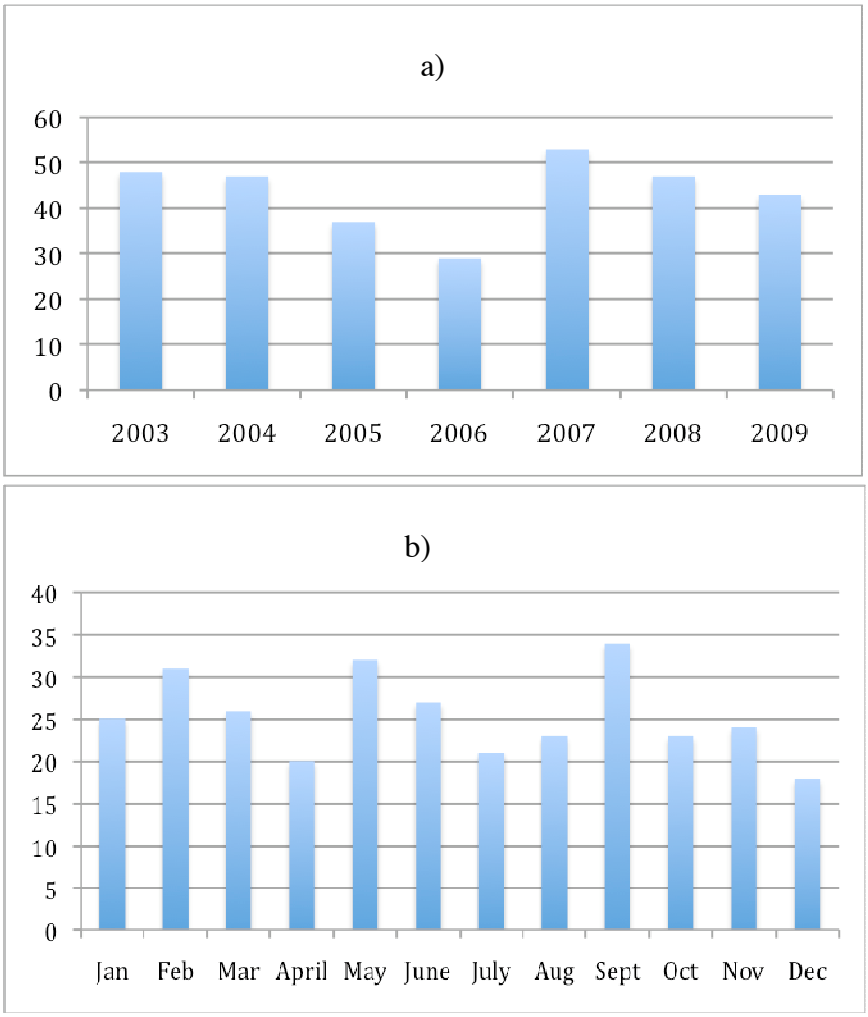


Fig.1. Suicide distribution: by year (a) and by month (b).

3.3. Sex and age distribution

The highest number of suicides occurred in males in all the studied age intervals. In fact, from the analysed 304 suicides in the FPD, 77.0% occurred in males and 23.0% in females. On the other hand, we can observe that this prevalence increases over the age until 74 years-old, with the highest percentage (20.4%) achieved between 65-74 years-old (Fig.2).

Adolescents and young adult's males represent 13.1% of all suicides that had been studied. This age group represents 17.1% of all the autopsies.

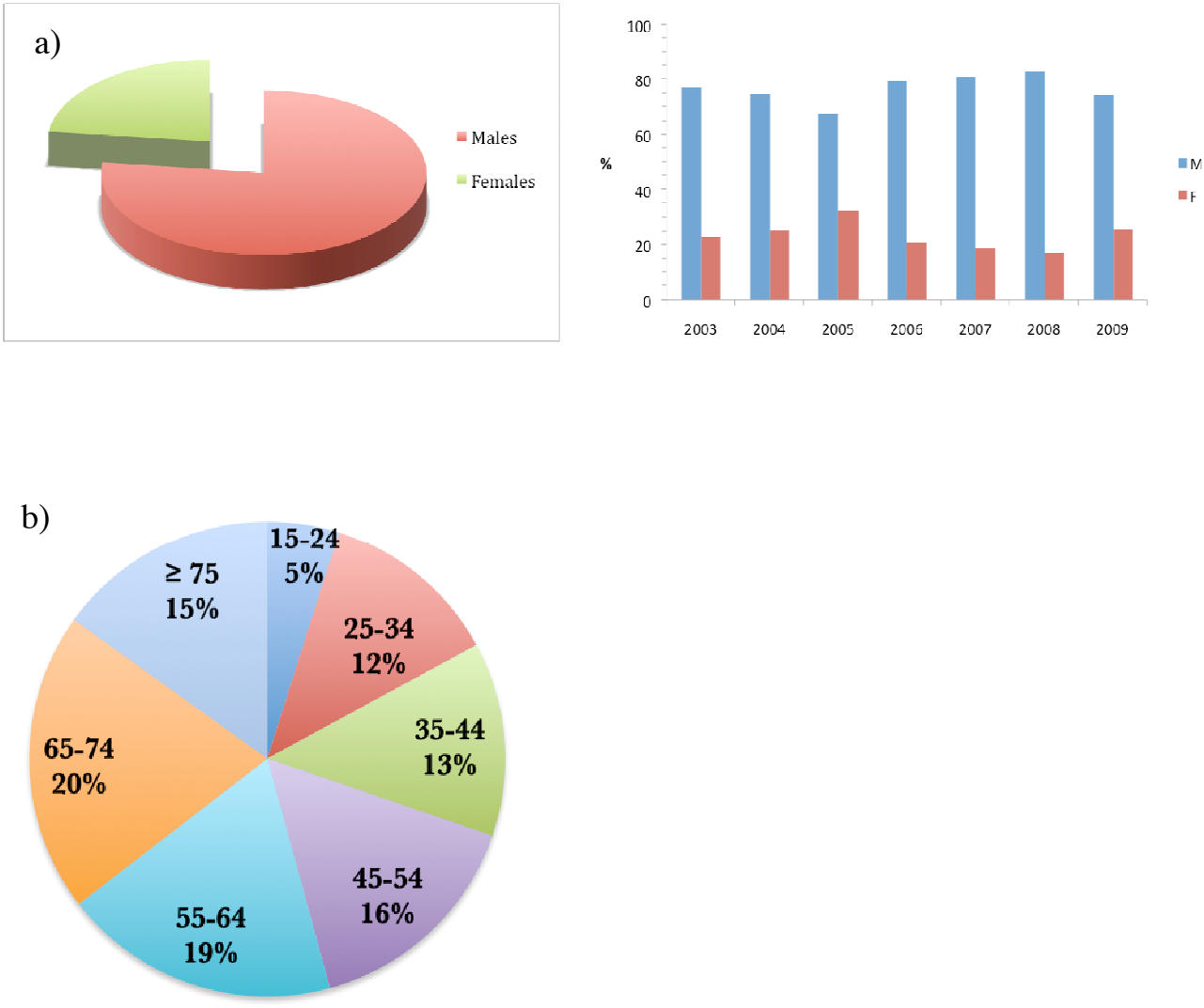


Fig.2. Suicide distribution: by gender (a) and by age group (b).

3.4. Marital status distribution

We had no information regarding marital status in 5 cases. Thus, from the analysed cases, we found that most of the suicides (163 cases, corresponding to 54.5%) occurred in married individuals, followed by single (23.7%), with adolescents and young adults representing 52.1% of all the single ones. In fact, there were no divorced or widowed individuals within adolescents and young adults. Single individuals belonging to this age class represented 12.4% of all suicides with marital status information (Fig.3).

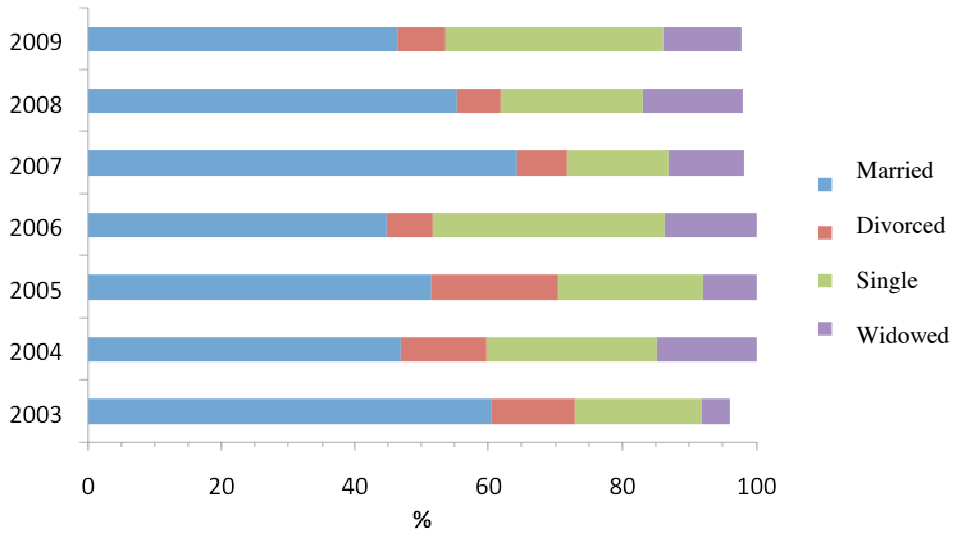


Fig.3. Marital status distribution by year.

3.5. Occupation distribution

When analysing this variable we concluded that it was only possible to have information in 225 cases. In these autopsies we observed that 46.7% of the fatal victims (105 cases) were employed when they commited suicide, and 37.8% were already retired.

Most of the individuals between 15-34 years-old were employed or were students (61.6% and 30.8%, respectively). In faxt, people with job in this age interval represent 10.7% of all the analyzed suicides with occupation information.

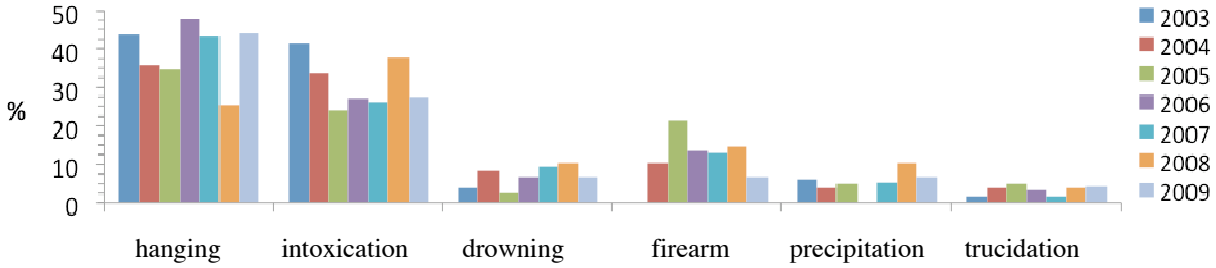
3.6. Suicide method

When determining the chosen methods to commit suicide, we concluded that hanging and poisoning were the favorite ones, with 119 and 97 cases, respectively, representing 39.1% and 31.9% of all the reviewed cases in the FPD, respectively. The third highest percentage corresponded to suicide with firearm (11.2%) followed by drowning (7.2%), precipitation (5.9%) and trucidation (3.6%).

The youngest suicidal individuals used the same methods. Hanging, poisoning and firearms stand as first choices, with 40.4%, 25.0% and 15.4% respectively. Neverthless, 18.5% of hanged people and 23.5% of fthe cases with firearms correspond to adolescents and young adults. However, there's no reported cases of drowning in these ages (Fig.4).

Electrocution, self-mutilation, suffocation and immolation were also found in 1, 3, 2 and 3 cases, respectively.

a)



b)

Suicide method	Percentage of cases
Hanging	39.1
Intoxication	31.9
Drowning	7.2
Firearm	11.2
Precipitation	5.9
Trucidation	3.6
Others	3.1

Fig.4. Suicide method distribution: by year (a) and by cases (b).

3.7. Toxicology requests

The toxicological analysis involved one or more of the substances mentioned below. In 5 cases, with specific suicide contexts (e.g. suffocation and intoxication), other substances, such as carboxyhemoglobin, strychnine and cyanide, were additionally searched.

3.7.1 Ethanol requests

From all the analysed suicide cases, 85.2% included ethanol analysis request (259 cases), and in 45 cases this analysis was not required. Within the requests for ethanol analysis, we observed that 2007 had the highest number of demands. However, it is important to notice that the demands percentage is stable (from 75.7% in 2005 to 90.6% in 2007) during the studied seven years.

3.7.1.1 Ethanol positive results

From the 259 cases subjected to ethanol analysis, 52 were positive, corresponding to 20.1% of the total analysed cases. The years 2003, 2008 and 2009 represented the highest number of positive cases. From all the positive cases, 92.3% corresponded to men (48 cases) and only 7.7% (4 cases) to women. Ethanol was detected in, mainly, individuals aged between 55 and 64 years-old, with 25.0% of the cases (13 cases) and adolescents and young adults represented 15.4% of all the ethanol positive cases. On the other hand, hanging was the method of suicide with the highest number of positive ethanol results (42.3%).

3.7.1.2 Ethanol Quantitative results

We concluded that the major percentage of the positive cases corresponded to a Blood Alcohol Concentration (BAC) $\geq$ 1.2 g/L, with 44.2% (23 cases), followed by a BAC $\leq$ 0.5g /L, with 34.6% of the positive cases and between 0.8 and 1.2 g/L, with 17.3% of the positive

results. Finally, the lowest percentage corresponded to 0.5 <BAC <0.8 g/L (3.8%). BAC ≥ 1.2 g / L reached the highest number of cases in around 91% of the males and 9% of the females.

3.7.2 Illicit Drugs requests

Among all the analysed suicides, 28.9% included illicit drugs analysis request (88 cases), and in 216 cases (71.1%) this analysis was not required. We observed that 2006 (41.4%), 2008 (40.4%) and 2009 (41.9%) presented the highest number of demands. This analysis was requested in all of the studied years, varying from 14.9%, in 2004, to 41.9%, in 2009. Thus, excepting 2007 there is an obvious upward trend on the requests since 2004. Analysing by gender, we were able to see that drugs of abuse were required in 29.9% of the males and in 25.7% of the females that committed suicide. Adolescents and young adults were the most important age interval with drugs analysis requests (37.5% of the total illicit drugs analysis), ages where the consumption of such substances has higher incidence. However, it's important to notice that individuals under 55 years-old represented 84.1% of this toxicological determination.

The two suicide methods with the highest percentages of illicit drugs analysis are hanging and firearm (31.9% and 29.4%, respectively).

3.7.2.1 Illicit Drugs results

Only 7 cases (8.0%) were positive for drugs of abuse in the FPD. These correspond to a number of 15 positive analysis of different drugs of abuse (one individual can be analysed to more than one illicit substance, so, to one suicide can correspond various positive analysis). Within these, 5 were taken in 2008, 3 in 2006 and 2007, 2 in 2005 and 1 in 2004 and 2009.

At this point it is important to describe the distinct drugs results according to its different classes. All positive cases included a positive result for *opiates*. *Cannabinoids* were the second most used drugs, with 5 positive cases. Three of all the positive cases were positive for *cocaine and metabolites*. There were no reported cases associated to *amphetamines and metamphetamines*. Once again, males were the greatest users, with just one positive result for *opiates* and another for *cocaine and metabolites* in females.

Crossing toxicological determinations and suicide methods used we have to report that 80% (4) of all *the* positive results for cannabinoids occurred in hangings.

When crossed this variable with age, we observed that adolescents and young adults were responsible for 73.3 % of all the positive results for illicit substances.

Verifying the relation with marital status we found that 10 (66.7%) of the 15 positive results corresponded to single individuals.

3.7.3 Prescription drugs requests

Prescription drugs were searched in 57.2% (174 cases) of all the studied suicides.

In 2007 medical drugs analysis were requested in 45 cases (84.9%), the highest values reached during the studied period. The first two years had the lowest values (25.0% in 2003 and 31.9% in 2004). The percentage of analysed cases increased from 25.0% in 2003 to 84.9% in 2007. Moreover, in the last two years the values stand on high values (68.1% and 79.1% in 2008 and 2009, respectively).

Males were the prevalent gender, with 73.0% (127) of all the prescription drugs requests.

Youngest suicidal individuals represented 14.3% of the requests and the highest number was reached in individuals aged over 54 years-old, with values near 60% in all classes of medical drugs analysed (*benzodiazepines, antipsychotics* and *antidepressants*).

3.7.3.1 *Prescription drugs results*

From all the medical drugs analysed cases, 63 (36.2%) presented a positive result. 12 of these results (19.4%) presented not only positive but also toxic dosages. 2006 had the highest percentage (61.9%) of positive results within all the analysed cases in each year. On the other hand, 2008 had the highest number of toxic results, with 4 cases.

Like in illicit drugs, to one suicide can correspond more than one prescription drug analysis. Thus, considering the distinct classes we observed that benzodiazepines (BDZ) and antidepressants (ATD) represented the most used prescription drugs, with 36 and 31 positive but no toxic results, respectively. Antipsychotics had only 10 positive results. Within just the toxic results, 3, 4 and 5 cases corresponded to benzodiazepines (BDZ), antidepressants (ATD) and antipsychotics analysis, respectively.

Females had the main percentage of all the 12 positive toxic results, with 83.3%. However, when considering all the 63 cases, men represented 37 and women only 26. All toxic dosages of BDZ were found in females. The most affected ages were above 45 years-old, with 77.8% of all the positive dosages.

3.7.4 Pesticides requests

Pesticide analyses were required in 48.4% (147 cases) of all the studied 304 suicides and the maximum percentages – 58.3% and 58.1% - were reached in 2003 and 2009, respectively. This determination of pesticides was only performed in 12 (32.1%) suicides in 2005, corresponding this year to the minimum value achieved.

Males had the highest request number as well as in individuals over 54 years-old. In this age group percentages varied from 43.5% to 59.2% depending on the pesticide type request (*Organofosfates, Organoclorades or Paraquat*). Ages between 15 and 34 years-old

had pesticide analysis requested in 9.5% to 13.6%, also accordingly to the different pesticides.

3.7.4.1 Pesticide Results

During the studied period we observed that the highest percentages on positive results were achieved between 2003 and 2005 and the year 2007 (from 55% in 2007 to 58.3% in 2004 and 2005). In the last two years these values were significantly smaller, with 36.0% in 2008 and 28% in 2009.

We concluded that pesticides analysis were only positive for *paraquat* and *organofosfates (OF)* - 24.5% and 23.1% of all pesticide requests, respectively, corresponding to 36 and 34 cases). In 2004 and 2005, around 33.3% of the analysis were positive for OF. The highest value for paraquat was reached in 2006, with 38.5% positive results from all paraquat analysis required in that year. Excepting in 2006 (when OF was positive in only 1 case), we observed a decrease in both classes in the last two years. In 2009 only 16% and 12% of pesticide requests were positive for OF and paraquat, respectively.

Once again, males were involved in more cases than females. In fact, 85.3% of the OF positive results and 75% of paraquat ingestion cases occurred in males.

Most of the positive results reached ages over 54 years old. This is more evident for OF, where these age groups represented 64.7%. of the OF positive cases. For paraquat, distribution is more homogeneous, except in ages between 15 and 24 years old, where there were no reported cases with this herbicide.

a)

Substance	*Requests*	*Positive Results*	*Positive cases*
Ethanol	*259*	*52*	*52*
Prescription drugs	*174*	*77*	*63*
Pesticides	*147*	*70*	*70*
Illicit drugs	*88*	*15*	*7*
Others	*5*	*5*	*5*

b)

BAC (g/l)	Positive results
≤ 0.5	18
>0.5 e <0.8	2
≥0.8 e <1.2	9
≥1.2	23

c)

Prescription drugs	Positive results
Antidepressants	31
Benzodiazepines	36
Antipsychotics	10

d)

Illicit drugs	Positive results
Cannabinoids	5
Opiates	7
Cocaine and metabolites	3
Amphetamines	0
Metamphetamines	0

e)

Pesticides	Positive results
Organofosfates	36
Paraquat	34
Organoclorades	0

Fig.5. Toxicology requests and positive results distribution: by substance type (a), and within each substance (b – ethanol, c – prescription drugs, d – illicit drugs, e – pesticides).

3.8 Personal history

3.8.1 Alcoholism and Drug addiction

Thirty none individuals (12.8% of the cases) had a history of regular consumption of alcoholic drinks. Within these, 25.6% (10 cases) had committed suicide in 2009 and only 5.1% in 2005.

Males were the greatest users, corresponding to 92.3% (36 cases) with alcoholism problems. Analysing the age groups we can conclude that the alcoholic behaviour is more prevalent between 65 and 74 years old (28.2%). From all the 39 analysed cases, 8 (20.5%) correspond to adolescents and young adults aged under 35 years-old.

Drug addiction represented only 3.6% (11 cases) of personal history of suicidal individuals. However, only 2004 had no reported cases with a history of addiction to drugs. In 2004 and 2009 there were 3 cases described in each year – the highest numbers.

Only 3 females (27.3%) were addicted to drugs in moment of suicidal act.

3.8.2 Suicide attempts and suicidal ideation

From all the 304 suicides autopsied, 11.8% (36 cases) attempted suicide more than one time. The highest percentage of suicide attempts was found in 2007, with 22.6% (12 cases) of all the suicides committed in that year. Moreover, the 3 last years represented 66.7% of all the individuals that had tried to kill themselves before. However, in 2006 there was only 1 case. Once again, females were present in only 16.7% (6 cases) of the previous attempts.

Attempts were most frequent in individuals between 55 and 64 years-old (25%) but the two youngest age groups (15-24 and 25-34 years old) together represented 27.8% (10 cases).

Suicidal ideation was reported in 15.5% of all the suicides studied and peaked/reached the highest value in 2007 (25.5% of all the individuals with suicidal ideation). In contrast, only 3 cases had been described in 2005. Those ideas were more frequent in males, too, corresponding to 74.5% (35 cases).

We noticed that 33 (70.2%) of all the 47 suicidal ideation cases happened in those older than 44 years-old. Adolescents and young adults represented only 14.9% (7 cases).

3.8.3 Physical illness and Psychiatric disorders

Suicidal individuals who had a physical illness when they committed suicide corresponded to 27.3% (83 cases) of all the analysed suicides. In each one of the years, percentages varied from 21.3%, in 2004, to 35.8%, in 2007. Once again, there was a supremacy of males, with 79.5% (66 cases).

The highest number of sick suicidal people was observed between 55 and 64 years-old (24.1%)

Psychiatric disorders have the highest number of cases within the variables chosen to evaluate the personal history. They were found in 30.3% (92 cases) of all the studied suicides. The year with the lowest number of people suffering from mental disease was 2008, with only 17.0% of the suicides occurred in this year. Maximum value, 39.6%, was reached in 2007.

Comparing these two last variables we observed that only in two years (2003 and 2008) the number of people suffering from organic disease was higher than those who suffered from a mental one. Once again, females (21.7%) are supplanted by males (78.3%).

The ages between 55 and 74 years old contained 48.9% of these sick people and the youngest ones (15-34 years old) represented 21.7%.

3.8.4 Isolation/Loneliness

In FPD this condition was found in 5.3% (16 cases) of the analysed suicides. It is present in all of the years and its percentages varied from 1.9%, in 2007, to 10.3%, in 2006, according to suicides studied in each one of the years.

Despite the difference between sexes be the smallest, males still represent 68.8% (11 cases). We found a homogeneous distribution by age groups.

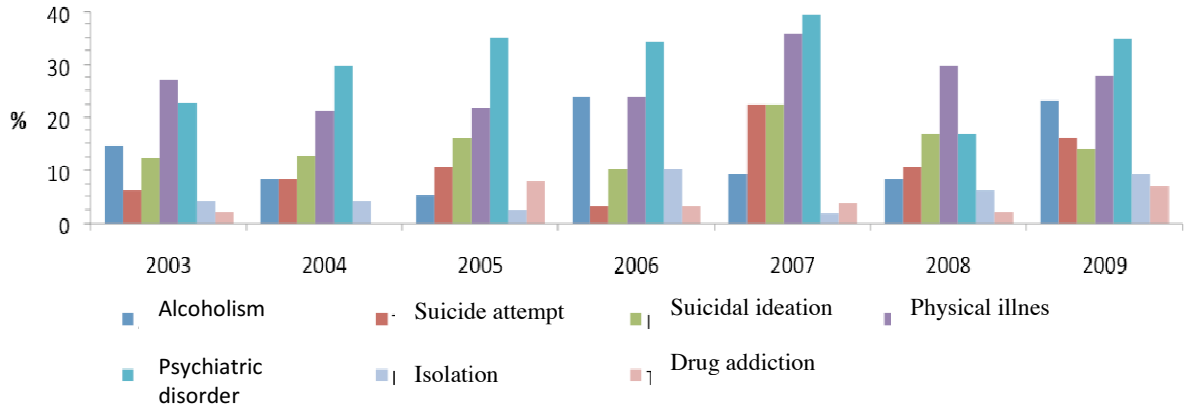


Fig.6. Personal characteristics distribution by year.

4. Discussion and conclusion

As mentioned above, the main objective of our work was the analysis of all the suicide cases from autopsies performed at the Forensic Pathology Department of the Centre Branch of the National Institute of Legal Medicine (INML, I.P.), between 2003 and 2009, in order to obtain a typical suicidal profile and then, address some prevention strategies already concluded/stipulated by other authors.

There are few national publications that studied some particular characteristics of the suicidal phenomenon, but none of these focused the years now studied as well as all the different evaluated variables. According to this public health problem, some major risk factors have been approached and, thus, most effective prevention plans achieved. However, most of them only focused global rates, merely obtained from respective national statistics and, therefore, some comparisons with the results now achieved are possible but not for all the variables. Then, the results will also be discussed taking into account our present medico-legal system, its reality and some of the prevention programmes.

Throughout the years, we observed a slight variation in suicide rates, from 29 cases (8.7%) in 2006 to a maximum of 15.6% (53 cases), in 2007. Thus, an increasing during the years was achieved. In fact, a study performed in the same Branch of the INML, I.P. and published in 2003, we could already see that 6.8% of all the autopsies between 1986 and 2001 corresponded to suicidal cases [12]. This increasing can be explained by a possible early suicide underestimation [4,8,9,15,16] and, thus, a lack knowledge to perform suicide diagnosis. Therefore, in the last years European efforts have being developed in order to improve suicide diagnosis, mainly represented by extensive death registration process researches [16]. Indeed, it is important to remember that, in Portugal, medico-legal autopsies are only performed if there is a court order. When a suspicion of injury/violent death (suicide, homicide and accident) is present, legal authorities often demand an autopsy. However we aren't able to state if they do it in all the cases because, as already mentioned, the decision belongs to courts [16]. Moreover, autopsies conclusions do not always clarify the type of injury death (etiology). Thus, we can assume that this increasing in suicide autopsies in the FPD of the Centre Branch of the INML, I.P. might reflect both the increasing concern to a more realistic registration of suicide cases and a real raise up in suicide rates. In fact, the increasing number of stressful factors [9] leads to a decreasing self-care. In a world where job and family create more and more responsibilities, people tend to spend less time with their family and the need to face the life troubles becomes harder and harder. At the beginning of XXI century, Portugal, as well as most of the western countries, presented a downward trend [11,17] and only adolescents had a slight increasing tendency like in many other European countries [4,9]. However, many studies have also stated the great number of undetermined deaths in our country [4, 8, 9, 18] and the related limitations in data validity.

We found that February, May and September were the most troubling months where there were a higher number of suicides autopsied in the FPD, results also achieved by others

[8,11,12]. The first two months corresponded to the most affected seasons: Winter and Spring. Despite September is not stated in any study as one of the most prevalent month to commit suicide, it seems possible to associate this month with the end of Portuguese holidays and the consequent return to work and quotidian life stress, but also with changing of the weather conditions, with darkness increasing in this time of the year (affecting the month of February, too). In fact, we can observe that the obtained seasonal variation in the suicide mortality rate is likely a result of a joint influence of several factors that exhibit seasonal variations themselves (the vacations period, duration of darkness, stressful life events and inclement weather) [11,18].

As also surveyed by other authors [2, 3, 8, 9, 10, 11] we concluded that suicide were more frequent in men than in women, in all age groups, with about 77.0% of the cases. Additionally, we achieved a 3,3 men/women ratio, reflecting the supremacy of men all over the world [8,17], excepting China. Despite a higher number of women with active social life, in fact, there will always be a major number of male suicides because of intrinsic mentality differences between both sexes. According to many others studies, women present the highest number of suicide attempts, but males tend to choose more violent means [4, 8, 10], that will assure the expected tragic end. Moreover, when crossing sex with the different suicide methods used, hanging and firearm shooting presented the highest differences between sexes and the number of females only equalled the number of males in drowning suicides, following the results of a German study performed in the beginning of the XXI century, where females supplanted males in this suicidal methodology [17].

Distribution trough age groups also showed an increasing prevalence among age. A slight upward trend within adolescents stated by some authors [8, 9, 17] is also visible in the youngest suicidal people (15-34 years old), from 12.5%, in 2003, to 20.9%, in 2009, with

some fluctuations. Easy access to information and lack of legislation and control of all media might play an important role in this result.

Controversial data about marital status and occupation have been published by many other investigators. Married and employed individuals describe our suicidal profile. However there are some studies where suicide seems to have a positive relationship, not only with the unemployment rates, but also with the marriage decreasing [11, 12, 13]. A possible explanation for our results can be the accumulation of quotidian factors (joint with problems at work) and consequent marriage misunderstandings. This hypothesis may also be supported by the diseases (organic and mental) percentages found in our study (27.3% and 30.3%, respectively). Unfortunately, a health problem can frequently disturb the harmony within many couples. On the other hand, unspecialized workers often receive unsufficient salary to support family costs, most of them belonging to local or small companies with no competitive market strength.

Our study demonstrates that there has been a change in the suicide method, as it has been recently observed in other international study [4]. In fact, until 2001, the Centre Region of Portugal presented self-poisoning as the most used method, a common/usual finding in the rural countries where the economy is essentially based on the agriculture exploration [8, 19]. In fact, according to those reasons we had already written, women's favorite suicide mean was self-poisoning (34.4% of suicidal females). However, this present study showed that in 39.1% of the suicides autopsied in FPD, hanging was the main choice for individuals to commit suicide and only in 2008 poisoning had a higher number of cases. Thus, self-poisoning has definitely been placed to the second place with, 31.9% of the analyzed suicides. A similar pattern had been observed in several other European countries (analyzing until the year 2002) [4, 10, 17]. A simple explanation can be the easier availability hanging methods and to the improvement on health care assistance, especially the great advances on

toxicological knowledge (e.g., new psychological medical drugs with less toxic effects, mainly antidepressants) [4, 10, 17]. On the other hand, the limitations in toxic substances' production, sales and use had been imposed in several countries, including Portugal and thus, some products are only available to authorized people.

We can see that among the studied suicides only 19 cases (6.3%) had no toxicological analysis requests, being ethanol the most searched substance (90.9% of all requests), followed by medical substances (61.1%), pesticides (51.6%) and, finally, illicit drugs (30.9%).

As a violent death, suicide often obliges the forensic pathologist to request toxicological analysis as a complementary exam, in addition to the autopsy findings, to better approach of suicidal act context. These requests aim to specify if a toxic compound was directly used for self-poisoning suicide or if its presence justifies the suicidal behavior (impairment state).

According to the increasing ethanol consumption, especially in males [9], it would be expectable that ethanol was the most searched substance (around 85%, both genders). Quantitative results showed that concentrations over 0,5g (66.4%) led to higher suicide risks. Thus, we can assume that individuals often look for courage and disinhibition when commiting suicide [12].

Prescription drugs (medical substances) were analyzed in 174 cases, 12 cases with toxic concentrations and 51 cases (29.3% of all the prescription drugs requests) with therapeutic concentrations. In fact, the three most important medical drugs classes studied (antidepressants, benzodiazepines and antipsychotics) play a very important role in therapy for psychological/mental disturbs, representing 30.3% of the evaluated cases. Additional reasons are, obviously, related to a significant underestimation of these pathologies and an higher prescription of those drugs, already reported in another studies [8].

According to Portuguese Suicidology Society, Prevention of Suicide belongs to the National Plan for Mental Health, elaborated by "Direção Geral de Saúde" since 2007. This plan also stated the increasing need to fight against depression, in order to decrease the suicide rates. Thus, our study stated an increasing number of therapeutic dosages throughout the years, mainly since that year.

Both results, ethanol and prescription drugs, confirmed the higher suicidal risk in modified psycho and cognitive skills.

At this point we have to emphasize the fact that we had few information to analyze and interpret the other variables studied in the present work. In fact, no studies have evaluated so many variables as we tried here. Therefore, the data now achieved has no comparable studies.

When analyzing the pesticides, we concluded that they were requested in 48.4% of all the suicides (147 autopsies). They constitute the most used toxic products in intoxication suicides, with 69 cases (71.1% of all intoxication cases) and, among the European Alliance Against Depression (EAAD) countries, Portugal still represents the most pesticide user in voluntary deaths [4]. Within the three different classes of the analyzed pesticides, paraquat was the most frequently encountered one (36 cases). In a three years analysis of pesticide intoxications in the centre of Portugal, suicide suspicion represented the highest proportion of pesticide requests [19]. In the agricultural areas, mainly in the neglected inward villages, these composts still represent an easy way to improve the quantity and quality of crops and, thereby, an easy access when contemplating suicide [8]. Additionally, the storage and use to individuals that work with these products facilities constitute the main reasons that sustain the data found.

However, some policies have been implemented (e.g., a closer control to pesticides sale, storage and use and one pill package of the most risky prescription drugs) and this may play a significant role on the pattern changing, from accidental deaths to suicidal deaths.

The last toxicological request to discuss corresponds to illicit drugs, since they were only determined in 28.9% of the cases (88 suicides). However, among the years we can report a relevant increase in this class determination, from 8 requests in 2003 (16.7% of all suicides autopsied in that year) to 18, in 2009 (41.9% of all suicides autopsied in that year). The illicit substances increasing consumption all over the world (WHO estimates that 155 to 250 million people with 15-64 years old had used non-prescribed psychoactive drugs in 2008) leads to a growing concern, not only due to their effect on individuals health, but also to all risky behaviors that may arise from its use. However, as expected, only 1 illicit drug intoxication (overdose) suicide was reported. Indeed, deaths related to the consumption of these substances are usually accidental, and suicides can eventually occur in those addicted individuals suffering from a depressive disorder. Although there were very few positive cases for illicit drugs, we may suppose that suicidal individuals seek, once again, for some disinhibition and bravery at the moment to commit suicide. On the lack of requests (especially in the first years) may underestimate the positive cases.

Opiates, cannabinoids and cocaine were the only illicit substances found, which is according to WHO data that stated the highest consumption of those within the drugs users.

The last variables that we decided to study may give a more specific behavioral characterization to the suicidal specific profile. In fact, in spite of strong limitations in the evaluation of these variables, we can propose/conclude a significant relation between suicide and some of the analyzed variables, namely, health disturb (psychiatric or physical ones). In fact, they corresponded to 30.3% and 27.3% of all suicides studied, respectively. Suicide attempts, alcohol abuse and suicidal ideation were also found in 11.8%, 12.8% and 15.5% of

the suicides, respectively. With only 3.6% and 5.3%, drug addiction and isolation constitute the less frequents individual characteristics.

Like the suicide itself, those risk factors may probably be underreported. However, a strong association between suicide mortality and a disease condition (mental or physical) and suicidal behaviors (attempts and ideas) had already been noticed in a great number of researches [8, 14, 20]. A European study, published in 2009, stated that 90% of all suicides occurred in a psychiatric disorder context and that the strongest predictor for completed suicide was the history of non-fatal suicidal acts [14]. In most studies, self-harm and suicide attempts were present in, at least 40%, of the suicide cases [8]. In 2007, the European Study on the Epidemiology of Mental Disorders concluded that the major depressive disorder and alcohol related problems were the most important conditions to progress from suicidal ideas to attempting suicide [15]. Isolation, alcohol and drugs addiction had also been considered as major risk factors in other studies [8, 13, 20].

Many researches had reported the highest number of suicide attempts in females [2, 7, 15]. However, our results stated an opposite conclusion. An easy explanation relies on the fact that this study had only analysed the personal history of completed suicides.

A probable relationship between variables but also between suicide risk and the number of variables in addition to the existence of many individuals with any of those personal history characteristics led us to conclude that when an individual presents more than one of these personal history characteristics, an additive/higher suicide risk is also present.

Psychological autopsies are, actually, beginning to assume the importance they deserve all over the world [8, 21]. In fact, in order to a better suicide diagnosis, "necropsy" is not always enough and psychological autopsy can be a very helpful device/implement in a violent death of an undetermined cause, preferably with a mental physician cooperation.

Moreover, it can constitute a therapeutic act to all people affected by a friend or a familiar suicide [21].

The results analysis of multiple risk factors for suicidal death and some limitations of their study had been discussed. Now, we are able to answer the main questions of this research: "What is the typical profile of suicidal individuals autopsied at FPD of Coimbra's delegation? Are there some changes? Can the prevention strategies be applied to this area of Portugal? In which way they are according to the obtained typical profile?"

Our "typical" individual is a male, between 65-74 years old, married, worker that hangs himself in September. The person would probably suffer from a mental or organic disease or, even, from alcohol related troubles or present suicidal trend (suicide attempts and/or suicidal ideas).

The strategies we may choose in this region are those published in Optimizing Suicide Prevention Programs and their Implementation in Europe - OSPI Europe study, added with one additional intervention proposed by EAAD in 2004 (Limit the access to lethal means), namely: 1 – Improve the detection and treatment of depressed and suicidal persons; 2 – Public relations campaign to encourage treatment seeking; 3 – Alert the community facilitators; and 4 –Interventions on affected people and high-risk groups. Other authors had already proposed more detailed/specifics strategies according to those five general intervention fields [8].

Education of professional primary care physicians in order to a better identification of depressed and suicidal risk people but also to improve the prescription methods (e.g., use of psycho drugs with less lethal effects) is an essential device and key prevention strategy

[4,8,15,20]. However, developing a chain of care, improving therapy groups, in health institutions and others social ones, a professional psychologist in each school and an ID emergency card identifying who had already commit a suicide attempt could also be very helpful [8,20].

Nowadays, the *Media* present, more than ever, a powerful influence on social customs and beliefs, especially on the youngest individuals. Stopping some social stigmas and changing some attitudes also constitute an evidence-based intervention, mainly to children and adolescents. Guidelines to a more responsible report of suicide cases had been stated as an important step [8, 20]. On the other hand, teachers, clergy members, people caring to elders, prison workers and more employees of others social institutions that contact with vulnerable population could also be trained in order to improve recognition of risk behaviors and signals [20].

A suicidal crisis is, often, an impulsive act and, thus, restrict the access to lethal means is considered an evidence-based prevention intervention [4, 20]. However a correct legislation review and application should be assured. Pesticides storage control, detoxification of pesticides and domestic gas, single pill packages for prescription drugs and gun-control laws may play an important role in this plan [4, 8, 17].

Within the institutional field, providing specific recommendations to improve the quality of suicide registration may assure the best approach to the suicide reality and, thus, to the most effectiveness prevention plans [16].

Finally, we can conclude:

- Typical suicide profile remains almost the same, with the exception of the suicide method that had changed to hanging;

- A slight increasing rate within youngest suicidal individuals was verified;

- Psychological autopsies should be a discussion point to improve suicide registration process;

- Prevention programs would probably have a positive influence on suicide statistics in the analyzed area.

However, to better understand the suicide phenomenon more studies need to be performed. We had just opened a very small window…

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